

**UNITED STATES DISTRICT COURT  
SOUTHERN DISTRICT OF GEORGIA**

|   |   |                   |
|---|---|-------------------|
| RESOLUTE FOREST PRODUCTS, INC., <i>et al.</i> , | ) |                   |
|   | ) |                   |
| Plaintiffs,                                     | ) | CIVIL ACTION FILE |
|   | ) | NO. CV116-071     |
| v.  | ) |                   |
|   | ) |                   |
| GREENPEACE INTERNATIONAL, <i>et al.</i> ,       | ) |                   |
|   | ) |                   |
| Defendants.                                     | ) |                   |
|   | ) |                   |

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**DECLARATION OF JAY R. MALCOLM  
IN SUPPORT OF GREENPEACE DEFENDANTS'  
MOTION TO STRIKE PURSUANT TO O.C.G.A. § 9-11-11.1**

I, **JAY R. MALCOLM**, hereby certify as follows:

I have been retained by Defendants Greenpeace International and Greenpeace, Inc. (“Greenpeace”) to render expert opinions regarding Greenpeace’s statements about Resolute's logging operations in the Canadian boreal forest. I submit this Declaration in support of Defendants’ Motion to Strike Pursuant to O.C.G.A. § 9-11-11.1, and in response to the declaration submitted by Peter Reich on behalf of Resolute Forest Products, Inc., Resolute FP US, Inc., Resolute FP Augusta, LLC, Fibrek General Partnership, Fibrek U.S., Inc., Fibrek International Inc., and Resolute FP Canada, Inc. (collectively, “Resolute”). I am over the age of 21, and I am competent to provide this Declaration. I make this declaration based on my own personal knowledge, and for all purposes allowed by law.

**Qualifications**

1. I am a Full Professor at the Faculty of Forestry at the University of Toronto, which I joined in 1996. I received my B.Sc. and M.Sc. from the University of Guelph, Ontario, my Ph.D. from the University of Florida, and I undertook Postdoctoral studies at Queen's

University, Ontario. My research interests include the impacts of human-induced landscape changes on biological diversity and ecological processes; the impacts of global warming on natural ecosystems; the diversity and abundance of temperate and tropical organisms; relationships between landscape structure and biological diversity; and mammalian ecology and biogeography. For the past 16 years, several of my students and I have been conducting research specifically on the ecological impacts of logging on boreal forests in Canada, with a regional focus on northeastern Ontario. I have additionally conducted field research in the Brazilian Amazon, the Central African Republic, and the Great Lakes - St. Lawrence forests of Ontario.

2. I have authored or co-authored 98 peer-reviewed articles in scientific journals and books, have given more than 60 invited scientific presentations, and have authored or co-authored numerous governmental and non-governmental technical reports, including for the Canadian and U.S. Governments, the Intergovernmental Panel on Climate Change, and the United Nations Environmental Program. I have taken part in numerous symposia and workshops on climate change and boreal forest management, and have served as a member of the Ontario Provincial Forest Technical Committee (a small group of experts tasked with evaluating Provincial forest management standards and guidelines). According to Google Scholar, my scientific work has been cited more than 7,900 times. During my career to date, I have supervised or co-supervised 23 research Masters and 10 Ph.D. students.

3. Attached hereto as Exhibit A is a true and correct copy of my curriculum vitae.

### **Summary of Opinions**

4. In my opinion, the Defendant's statements that Resolute is "destroying" the boreal forest through its boreal logging operations, and in the process is contributing to global climate change, are entirely reasonable. A forest consists of more than its trees. For example, if an

original natural forest with its myriad wildlife plant and animal species is replaced by a forest with only a fraction of those species, then it is reasonable to my mind to say that the forest in its original condition has been destroyed. As I detail below, Resolute's logging activities in this sense can be expected to be destroying the original boreal forest as a result of significant changes to the fundamental nature of the forest from both regional and local perspectives. Through their logging, Resolute is also contributing to global climate change in that their activities can be expected to be resulting in a net release of carbon into the atmosphere.

### **Resolute Is Destroying The Boreal Forest**

5. Greenpeace is correct in noting that Resolute is contributing to the destruction of the boreal forest. In rare cases, boreal logging results in the outright loss of forest. For example, in the comprehensive examination of boreal regeneration success undertaken by the (then) Ontario Ministry of Natural Resources in 1992, 4% of the area logged 5-15 years earlier ended up being “not stocked” (i.e., areas in which tree cover was less than 40%).<sup>1</sup>

6. However, destruction can mean many different things. If the fundamental nature of the forest is degraded during the course of management -- for example by the loss of wildlife species or ecological processes -- then we can also reasonably say that it has been destroyed. After all, a forest consists of more than its trees.

7. Central to this issue in a Canadian boreal context is the fact that the great majority (>90%) of logging of boreal forests in Ontario is of primary forest; that is, forest that has never been logged before.<sup>2</sup> Due to logging, a fundamental change in the nature of the forest occurs during this transition from the original primary forest, characterized by natural disturbances such

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<sup>1</sup> Hearnden, K.W., Millson, S.V., and Wilson, W.C. 1992. A report on the status of forest regeneration. Queen's Printer for Ontario, Ontario, Canada.

<sup>2</sup> Environment Canada (1995) cited by Smith et al. 2000 (Canada's Forests at a Crossroads: An Assessment in the Year 2000. Global Forest Watch Canada, World Resources Institute, Washington, D.C.).

as fire and wind throw, to the secondary forest in which the main disturbance type is logging (and associated activities). In outlining the types of changes that take place during this transition, it is useful to approach the issue from both a regional perspective and a local perspective. As outlined below, from both perspectives, logging results in destruction of the original forest.

8. Concerning the regional perspective, it is illustrative to consider the changes that occur when original primary forest landscape is transformed via clearcutting into one that has been optimized for timber production (into what is termed a *regulated* forest). In a primary forest landscape, one expects about 38% of the various forest parcels to be older than the average time period between successive fires for a given location, which is usually taken to be around 100 years (for example, see Ex. C from Dr. Reich's Declaration). In contrast, in a regulated forest landscape, one wishes to have every forest age equally represented *up to* the rotation age, which also is around 100 years. This means that the ages of the forest parcels that make up the two landscapes are radically different: in the first, parcels older than 100 years (which we can term old-growth forests) are relatively common; in the second, they are absent. Many plant and animal reach greatest abundances in these older forests, highlighting the change in the fundamental nature of the forest landscape that accompanies this transition.

#### **Logging Destroys Wildlife Habitat at Both a Local and Regional Level**

9. In his Declaration on behalf of the Plaintiff, Dr. Reich cites Cyr et al. (2009; see his Ex. C), which provides an empirical example of this landscape transition in northwestern Quebec. Compared to the original forest, the secondary forest had much less forest that was older than 100 years: 13% compared to 55% in the original forest. Dr. Reich mentions these differences, but does not consider them to be important because the same *range* of forest ages is

evident in the two landscapes. However, from a wildlife perspective, the range of forest ages is not the problem. Plant and animal species need areas of habitat to inhabit in order to maintain viable populations: it is the amount of a particular type of habitat, rather than its mere presence, that is critical here. In the managed landscape studied by Cyr et al. (2009), a substantial reduction in these old growth habitats was observed in comparison to the original forest. As clearcut logging continues, and the transition to a regulated landscape proceeds, we can expect further reductions in the amount of oldgrowth habitats. The net effect will be progressive endangerment of oldgrowth-loving species.

10. The longer term effects of this transition are illustrated by a study in Finland, where the transition from the original primary forest to an optimized logged landscape occurred longer ago, and which represents a future scenario of logging in Canada. The authors found forests older than 100 years to be much less common in the managed landscapes of southern Finland than in the local parks and reserves (10% vs. 57%), and that several oldgrowth-loving bird species were disproportionately restricted to the parks and reserves.<sup>3</sup> Studies have noted the parallels between Canadian and European logging and expectations are that similar problems will develop in Canada under current management practices.<sup>4</sup>

11. A second (and related) regional change that has occurred due to boreal logging is a change in the tree species composition of the forest, from a more conifer dominated forest to one characterized by greater abundances of deciduous tree species (especially poplars). Several studies have documented this change, which is especially pronounced on upland sites where

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<sup>3</sup> Virkkala, R. Rajasarkka, A., Vaisanen, R. A., Vickholm, M., and Virolainen, E. 1994. The significance of protected areas for the land birds of southern Finland. *Conservation Biology* 8:532-544.

<sup>4</sup> Louis Imbeau, Mikko Mönkkönen and André Desrochers. 2001. Long-term effects of forestry on birds of the eastern Canadian boreal forests: a comparison with Fennoscandia. *Conservation Biology* 15:1151-1162.

mechanized logging exposes mineral soils that are rapidly colonized by poplars.<sup>5</sup> In the comprehensive study of post-logging regeneration in boreal Ontario cited earlier, Hearnden et al. (1992) documented a large change in forest composition in this regard, from 6% deciduous forests in the original forest to 19% in the post-logged forests 5-15 years later. This was despite the intention of the management to leave the tree species composition unchanged. Jackson et al. (2000) also documented this transition in boreal Ontario. The original forest, as determined from land surveyor documents from 1857, had 10% deciduous composition (“intolerant hardwoods”) compared to 65% for the period 1981-95.<sup>6</sup>

12. Given that a primary distinction among boreal plant and animal species is their affiliation for either conifer- or deciduous-dominated forests, the logging-associated change in forest composition has important implications for wildlife. Boreal caribou are a case in point. The transition from a coniferous to a deciduous landscape results in one that is much more productive for moose and deer. An abundance of these species in turn attracts high density of wolves, resulting in higher mortality of caribou and lower recruitment.<sup>7</sup>

13. Boreal logging is also destructive from a more local perspective. Many authors have pointed out the differences between fire as a disturbance agent and logging, and have discussed the associated implications for ecosystem processes.<sup>8</sup> A key effect of logging is a reduction in the dead wood supplies of the forest, included downed logs and standing dead trees.

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<sup>5</sup> Carleton, T.J., and MacLellan, P. 1994. Woody vegetation responses to fire versus clear-cutting logging: a comparative survey in the central Canadian boreal forest. *Ecoscience* 1:141-152.

<sup>6</sup> Jackson, S. M, Pinto, F., and Malcolm, J. R. 2000. A comparison of pre-European settlement (1857) and current (1981-1995) forest composition in central Ontario. *Canadian Journal of Forest Research* 30:605-612.

<sup>7</sup> Festa-Bianchet, M., Ray, J. C., Boutin, S., Côté, S. D., and Gunn, A., 2011. Conservation of caribou (*Rangifer tarandus*) in Canada: an uncertain future. *Canadian Journal of Zoology* 89:419-434.

McLoughlin, P. D., Dunford, J. S., and Boutin, S., 2005. Relating predation mortality to broadscale habitat selection. *Journal of Animal Ecology* 74:701-707.

<sup>8</sup> For example, see McRae, D.J., Duchesne, L.C., Freedman, B., Lynham, T.J., and Woodley, S. 2001. Comparisons between wildfire and forest harvesting and their implications in forest management. *Environmental Reviews* 9:223-260.

These materials provide habitat for a wealth of species, from bird species that nest in the cavities of dead trees, to a host of insect and fungi species that specialize on dead wood habitats.

Logging results in a net export of fiber from the ecosystem, with a net effect being a reduction in dead wood resources compared to the original forest.<sup>9</sup> This loss of dead wood resources, which is expected to intensify as a site is logged repeatedly, is arguably one of the largest impacts of logging from a wildlife perspective. One can again turn to Europe, which has a longer history of boreal logging and hence where biodiversity impacts are most pronounced. Loss of dead wood resources due to logging in Finland has threatened literally hundreds of insect and fungi species.<sup>10</sup> Work of one of my students has similarly documented logging-induced declines of dead wood fungal species in boreal Ontario.<sup>11</sup>

### **Boreal forest logging is contributing to global climate change**

14. Greenpeace is entirely reasonable in stating that Resolute's logging activities are contributing to global climate change. Dr. Reich makes much of the study by Kurz et al. (2013), which found a net uptake of carbon by the managed (secondary) boreal forest. To me, it is not surprising that this secondary landscape is taking up carbon: the relatively young forests of areas logged in the past several decades areas can be expected to be actively sequestering carbon as the trees grow. Importantly however, Dr. Reich (and that study) fails to consider the effects of the transition from a primary to a secondary landscape, which is a critical part of the overall boreal

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<sup>9</sup> Hansen, A. J., Spies, T. A., Swanson, F. J., and Ohmann, J. L. 1991. Conserving biodiversity in managed forests: lessons from natural forests. *Bioscience* 41:382-392.

<sup>10</sup> Rassi et al. 1992 cited by Siitonen, J. 2001. Forest management, coarse woody debris and saproxylic organisms: Fennoscandian boreal forests as an example. *Ecological Bulletins* 49: 11-41.

<sup>11</sup> Fischer, A. L., Moncalvo, J-M, Klironomos, J. N., and Malcolm, J. R. 2012. Fruiting body and molecular rDNA sampling of fungi in woody debris from logged and unlogged boreal forests in northeastern Ontario. *Ecoscience* 19:374-390.

uptake and release of carbon by the boreal forest. To put it simply, Dr. Reich in large part ignores the fact that any positive effects must be balanced against the negative effects.

15. As noted earlier, primary landscapes tend to have larger areas of older forests than secondary ones; this means that they also have more timber (and more carbon). During the transition from a primary to a secondary landscape, companies inevitably find themselves making a transition from a situation in which timber is abundant to one in which less timber is available (the so-called *falldown effect*). The same falldown effect applies to carbon. This means that any positive effects of forest management -- for example, carbon sequestration by young forests or long-term storage of carbon in wood products -- must be measured against the “debt” that is incurred during this transition.

16. As an illustration of the importance of this idea, Fargione et al. (2008) consider this problem in detail for the specific case of converting primary ecosystems to agricultural biofuel production and calculated how long it takes to pay off the debt; that is, the time period involved from making climate change worse (through net emissions of carbon to atmosphere) to actually improving the situation (i.e., net removal of carbon from the atmosphere).<sup>12</sup> They found that the magnitude of the debt imposed a relatively long period of net negative effects. For example, even concerning the conversion of native prairie (with its carbon rich soils) to ethanol-producing corn, the period before payoff was some 93 years. For tropical rainforests, debt periods ranged from 86-423 years (even accounting for the carbon stored in wood products from the logging of the original forest).

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<sup>12</sup> Fargione, J., Hill, J., Tilman, D., Polasky, S., and Hawthorne, P. 2008. Land clearing and the biofuel carbon debt. *Science* 319:1235-1237

17. Trivino et al. (2016) provide an illustration of the importance of the falldown effect for a boreal forest.<sup>13</sup> They modelled multiple land-management scenarios over a 50-year period for a highly-managed (regulated) forest landscape in central Finland. One scenario was to maximize timber revenues through “business as usual” [BAU]) management; another was to leave the forest unlogged (“set aside” [SA]), approximating the conditions of the original primary forest<sup>14</sup>. Carbon storage, which included live and deadwood carbon pools, logging slash, and timber extracted, under the BAU scenario was only 63% of that under the SA scenario. Interestingly, two indices of wildlife values similarly showed strong differences between these two scenarios. An index based on deadwood diversity was 30% lower in BAU than in SA; one based on habitat supply for six socially and economically important wildlife species was 56% lower. This single study illustrates nicely the logic behind Greenpeace's assertions that Resolute's boreal logging is contributing to the destruction of the boreal forest and, at least in the short- to medium-term, is worsening global warming.

18. The net reduction in carbon stocks under forest management is also evident in a European study that estimated net effect climate change effects of forest changes from 1750 to 2010.<sup>15</sup> Despite a considerable increase in forest cover (afforestation) over this time period, the authors concluded that forest changes had resulted in a large carbon debt (3.1 petagrams of carbon). Losses of forest carbon due to forest management played a key role in this net release of carbon into the atmosphere. Stocks of carbon in living biomass, coarse woody debris, litter,

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<sup>13</sup>Trivino, M., Pohjanmies, T., Mazziotta, A., Juutinen, A., Podkopaev, D., Le Tortorec, E., and Mönkkönen, M. 2016. Optimizing management to enhance multifunctionality in a boreal forest landscape. *Journal of Applied Ecology* (Online):1-9.

<sup>14</sup> The difference in age between managed and unmanaged forests in boreal eastern Ontario and western Quebec is about 65 years. Average historical ages of four management units were estimated by Bergeron et al. (*Canadian Journal of Forest Research* 31:384-391 [2001]) to be 132 years. Current ages of three units in the same region averaged 67 years, as calculated from Provincial digital forest resource inventories (Malcolm unpubl.).

<sup>15</sup> Naudts, K., Chen, Y., McGrath, M. J., Ryder, J., Valade, A., Otto, J., and Luyssaert, S. 2016. Europe's forest management did not mitigate climate warming. *Science* 351:597-600.

and soil were estimated to be, respectively, 24, 43, 8, and 6% lower in managed forests than in unmanaged forests.

19. Calculating the time period over which the debt incurred in Canada might be repaid, if ever, is unfortunately very difficult and involves major uncertainties. These include the effects of forest management on soil carbon (especially of peatlands and permafrost), the responses of managed and unmanaged forests to the recent and future climate change, and carbon fluxes from unmanaged forests. Of course, the behaviour of the forest industry itself is important in this regard; for example, the debt can potentially be reduced by increasing carbon stocks in managed forests and by decreasing emissions incurred during the production and storage of wood products. Although the storage of carbon in wood products is widely assumed to incur a net carbon benefit of forest management (for example, the fine furniture mentioned by Dr. Reich), a recent life-cycle analysis of the forestry industry in the United States found that the industry was adding much more carbon to the atmosphere than it was removing from it.<sup>16</sup> Carbon sequestration in wood products comprised only 34-42% of total carbon emissions from the industry.<sup>17</sup>

20. The evidence is that Canadian boreal logging is actually making the climate change problem worse. Given the importance of drastically reducing greenhouse gas emissions as soon as possible in order to avoid catastrophic climate change<sup>18</sup>, to my mind it is a much

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<sup>16</sup> Heath, L. S., Maltby, V., Miner, R., Skog, K. E., Smith, J. E., Unwin, J., and Upton, B. 2010. Greenhouse gas and carbon profile of the U.S. forest products industry value chain. *Environmental Science and Technology* 44: 3999-4005.

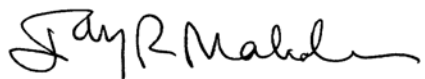
<sup>17</sup> Emissions included direct emissions from manufacturing, indirect emissions associated with purchased electricity, emissions associated with product end-of-life (methane from landfills), emissions associated with non-fiber input, and emissions related to transportation.

<sup>18</sup> According to the latest IPCC report, by 2015 global GHG emissions must be reduced by 40-70% over 2010 levels to likely avoid an average temperature increase of over 2°C (IPCC 2014; p. 22). IPCC. 2014. *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, Pachauri, R.K. and Meyer, L.A. (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

better climate change strategy to leave as much carbon as possible stored in the existing primary forest.

21. I declare, certify, verify and state under penalty of perjury that the foregoing is true and correct.

This 22nd day of January, 2017.

A handwritten signature in black ink, appearing to read "Jay R. Malcolm". The signature is fluid and cursive, with a long horizontal stroke at the end.

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Jay R. Malcolm, Ph.D.

# EXHIBIT A

## **CURRICULUM VITAE**

**Jay R. Malcolm**

### **ACADEMIC HISTORY**

#### **Degrees:**

- Ph.D. 1991, University of Florida, School of Forest Resources and Conservation,  
Wildlife Ecology  
M.Sc. 1983, University of Guelph, Zoology  
B.Sc. (Hon.) 1980, University of Guelph, Zoology

#### **Academic Appointments:**

- 2012-present. Graduate Coordinator, Faculty of Forestry, University of Toronto  
2014-present. Full Professor, Faculty of Forestry, University of Toronto  
2002-2014. Associate Professor, Faculty of Forestry, University of Toronto  
2012. Cross appointed, Department of Physical and Environmental Sciences, University of  
Toronto Scarborough  
2009. Adjunct Professor, Faculty of Forestry and the Forest Environment, Lakehead University  
1999. Cross-appointed, Department of Geography, University of Toronto  
1998. Associate, Centre for Research in Earth and Space Technology  
1997. Cross-appointed, Royal Ontario Museum  
1997-2001. Assistant Professor, Faculty of Forestry, University of Toronto

### **AWARDS AND HONOURS**

2015. Academic Teaching Award (Awarded by Faculty of Forestry Undergraduate and  
Graduate Students)  
2009. Academic Teaching Award (Awarded by Faculty of Forestry Undergraduate and  
Graduate Students)  
2009. Best Student Oral Presentation Award, 30th Canadian Symposium on Remote Sensing  
(Kuttner and Malcolm)  
2001. Honourable Mention, Student Paper Award, Conservation Biology Annual Meeting  
(Pardini and Malcolm)  
1997. Participant, Young Scholar Dialogue, Conservation Ecology (Issues 1 and 2)  
1991-1992. NSERC Postdoctoral Fellowship  
1985-1988. NSERC Postgraduate Scholarship  
1983. M.Sc. Awarded with Distinction  
1981. NSERC Postgraduate Scholarship  
1980. Ontario Graduate Scholarship  
1980. University of Guelph Scholarship  
1980. NSERC Undergraduate Summer Research Award

### **PROFESSIONAL EXPERIENCE**

- 2015-present. Technical Advisory Group, IntAct: International Action for Primary Forests  
2003-present. National Council, World Wildlife Fund Canada  
2000-2003. Ontario Ministry of Natural Resources Forest Technical Committee

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**Consulting:**

- 1999-2000. Pew Center on Global Climate Change. Ecosystems and global climate change: A review of potential impacts on U.S. terrestrial ecosystems and biodiversity.
- 1998. Ontario Ministry of Natural Resources. Applied multivariate statistics for ecologists: A workshop on multivariate statistical methods.
- 1998. United Nations Environmental Program. Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies.
- 1997. Hagler Bailly Services, Inc. (for the U.S. Environmental Protection Agency). Vulnerability to climate change of ecological resources in 25 U.S. States.
- 1995-1996. World Wildlife Fund (WWF)-U.S. Impacts of climate change on wildlife populations in protected areas; impacts of climate change on arctic wildlife.
- 1995. WWF-U.S. Multivariate modelling of impacts of climate change on southern African ungulate populations.
- 1994-1995. WWF-U.S. Development of quantitative methodologies to assess wildlife vulnerability to climate change; adaptation to climate change.

**Field Research:**

- 2010-2015. Haliburton Forest, Ontario. Understanding spatial variation in small mammal populations and relationships with forest structure and dynamics.
- 2005-2014. Northeastern Ontario, Canada. Boreal wildlife communities as a function of woody debris supplies and tree cohort structure.
- 2005. Jari Cellulose SA, Monte Dourado, Brazil. Small mammal communities of Eucalyptus plantations and primary and secondary forests.
- 2002-2004. Central Ontario (principally Algonquin Provincial Park and Haliburton Forest). Multi-scale habitat selection by American martens and flying squirrels in the Great Lakes - St. Lawrence forests of central Ontario.
- 2002. Kayapó Indigenous Area, Pará, Brazil. Effects of Brazil nut harvesting on the ecology of spiny rats (Proechimys, Echimyidae).
- 2001. Haliburton Forest, Ontario. Insect diversity in temperate forest canopies.
- 1996, 2000. Kayapó Indigenous Area, Pará, Brazil. Effects of selective logging on forest structure and small mammal communities.
- 1997-2000. Northeastern Ontario, Canada. Effects of logging on insect, bird, and small mammal communities in boreal forests
- 1993-1994. Dzanga-Sangha Dense Forest Reserve, southwestern Central African Republic. Three-dimensional structure of small mammal populations and habitats in undisturbed and selectively-logged forest.
- 1991-1992. Juruá River, western Amazonia, Brazil. Ecological and evolutionary significance of Amazonian riverine barriers.
- 1986-1989. Biological Dynamics of Forest Fragments Project, Amazonas, Brazil. Influence of forest fragmentation on small mammal populations and habitats. Additional field expeditions to the upper Urucú river and the Balbina dam site.
- 1983-1984. Biological Dynamics of Forest Fragments Project, Amazonas, Brazil.

**Laboratory Research:**

- 1992-1993. Department of Biology, Queen's University, Ontario. Use of PCR and sequencing to determine cytochrome *b* sequences of two mouse opossums.

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**Research Assistantships:**

- 1991. Dr. T. T. Struhsaker, University of Florida. Analysis of long-term data set on climate, tree phenology, and rodent abundance in Kibale Forest Reserve, Uganda.
- 1983. Dr. R. J. Brooks, University of Guelph, Ontario. Small mammal trapping in Churchill, Manitoba. Microcomputer applications.
- 1980. Dr. R. J. Brooks, University of Guelph, Ontario. Age determination of beaver; tests of optimal foraging theory using house mice; small mammal trapping in Churchill, Manitoba.
- 1980. Dr. D. H. Lynn, University of Guelph, Ontario. Ciliate systematics.

**RESEARCH GRANTS**

- 2016-17. Sharing of Aboriginal Traditional Ecological Values for Incorporation into Sustainable Forest Management and Community Ecosystem Services. St. Denis, Thusky, Polson, St. Denis, Van Schie, and Malcolm. National Indian Brotherhood, \$34,703. (50% authorship of proposal, 33% contribution to my research).
- 2015-17. Incorporation of Algonquin Traditional Ecological Values into Sustainable Forest Management for Ecosystem Service Benefits. Malcolm and Van Schie. MITACS Accelerate PhD Fellowship, \$54,000. (50% authorship of proposal, 75% contribution to my research).
- 2015-17. Incorporation of Algonquin Traditional Ecological Values into Sustainable Forest Management for Ecosystem Service Benefits. Malcolm and Van Schie. Anishnabek Outfitting Inc., \$36,000. (50% authorship of proposal, 75% contribution to my research).
- 2015-16. Short- and long-term effects of forest management on ground beetles (Carabidae) in Haliburton Forest. Malcolm and Smith. Brown Fund, Haliburton Forest, \$18,000. (100% authorship of proposal, 100% contribution to my research).
- 2014. Wolves as indicators of ecosystem services in Wolf Lake First Nation traditional lands. Malcolm and Thompson. MITACS Accelerate Internship, \$7,500. (75% authorship of proposal, 75% contribution to my research).
- 2014. Wolves as indicators of ecosystem services in Wolf Lake First Nation traditional lands. Malcolm and Thompson. Anishnabek Outfitting Inc., \$7,500. (75% authorship of proposal, 75% contribution to my research).
- 2014-16. Wolf Lake First Nation Wolf Study. Wolf Lake First Nation. Van Schie and Malcolm. Mitsubishi Corporation, \$86,700 (50% authorship of proposal, 75% contribution to my research).
- 2012-13. Understanding spatial variation in small mammal populations and relationships with forest structure and dynamics. Malcolm and Thomas. Brown Fund, Haliburton Forest, \$17,000. (50% authorship of proposal, 100% contribution to my research)
- 2011-2016. Effects of forest management on dead wood supply and implications for biodiversity. Malcolm. NSERC, \$190,000. (Sole author of proposal, 100% contribution to my research)
- 2011. Effects of experimental removal of downed woody debris on boreal small mammal populations. Malcolm and Thompson. Canadian Forest Service, \$3,000. (Sole author of proposal, 100% contribution to my research)
- 2011. Dual-beam laser altimetry system for ground-based remote sensing of tree and forest canopy structure. Thomas, Chen, Caspersen, Malcolm, Smith, and Murphy. NSERC, \$34,600. (5% authorship of proposal, 5% contribution to my research)

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- 2010-11. Understanding spatial variation in small mammal populations and relationships with forest structure and dynamics. Malcolm and Thomas. Brown Fund, Haliburton Forest, \$12,000. (50% authorship of proposal, 100% contribution to my research)
- 2010-11. Ontario Forest Resource Inventory Enhancement using ADS40 Aerial Imagery and LiDAR data. MITACS Elevate Industrial Fellowship to Ben Kuttner. Kuttner, Malcolm, and Van Damme. MITACS, Inc., \$140,000. (50% authorship of proposal, 50% contribution to my research)
- 200-13. Potential effects of biofuel harvesting on the biodiversity of woody debris: indicator species, biological thresholds, and future habitat supply. Malcolm, Johnson, Moncalvo, Morris, and Thompson. Ivey Foundation, \$90,000. (Sole author of proposal, 100% contribution to my research)
- 2010. Effects of experimental removal of downed woody debris on boreal small mammal populations. Malcolm and Thompson. Canadian Forest Service, \$5,000. (Sole author of proposal, 100% contribution to my research)
- 2009. Effects of experimental removal of downed woody debris on boreal small mammal populations. Malcolm and Thompson. Canadian Forest Service, \$9,000. (Sole author of proposal, 100% contribution to my research)
- 2008. Effects of experimental removal of downed woody debris on boreal small mammal populations. Malcolm and Thompson. Canadian Forest Service, \$3,500. (Sole author of proposal, 100% contribution to my research)
- 2008-2010. The role of downed woody debris in nutrient retention and cycling in boreal mixedwoods of northeastern Ontario. Malcolm, Morris, Meyer, Klironomos, Moncalvo, Thompson, Smith, and Peng. Ontario Ministry of Natural Resources Vegetation Management Alternatives Program, \$83,448. (Sole author of proposal, 90% contribution to my research)
- 2007-2008. Projected tree distributions in the Credit Valley Conservation Authority under global warming. Malcolm. Credit Valley Conservation Authority, \$10,000. (Sole author of proposal, 100% contribution to my research)
- 2007-2008. Projected forest composition in Haliburton forest in a changing climate. Malcolm. Brown Fund, Haliburton Forest, \$10,000. (Sole author of proposal, 100% contribution to my research)
- 2007-2008. Meteorological instrument tower for integrated forest ecosystem research. Thomas, Smith, Malcolm, Caspersen, Chen, and Basiliko. NSERC Research Tools and Instruments - Category 1, \$113,213. (5% authorship of proposal, 5% contribution to my research)
- 2007-2009. Multi-cohort Forest Classification Using LiDAR. Malcolm, Durst, Pineau, Woods, Bidwell, and Rudy. Ontario Centre of Excellence, \$72,900. (Sole author of proposal, 100% contribution to my research)
- 2007. Conservation of the boreal forest as a strategy to combat global warming. Malcolm and Thomas. Greenpeace Canada, \$9,000. (25% authorship of proposal, 50% contribution to my research)
- 2007-2011. Effects of experimental manipulation of dead wood supplies on boreal small mammal, insect, and fungal communities. Malcolm. NSERC, \$110,000. (Sole author of proposal, 100% contribution to my research)
- 2005-2007. Multi-cohort forest management in north-eastern Ontario: cohort classification, associated wildlife communities, and projected stand dynamics. Malcolm, Caspersen, Drapeau, Smith, and Thompson. Forestry Futures Trust, \$305,000. (Sole author of proposal, 100% contribution to my research)

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- 2005-2007. Dynamics of woody debris in eastern boreal forests: implications for carbon and wildlife management. Malcolm, Drapeau, Klironomos, Moncalvo, Peng, Smith, and Thompson. Sustainable Forest Management Network, \$444,720. (Sole author of proposal, 90% contribution to my research)
- 2005-2006. A review of responses of boreal wildlife to partial cutting. Malcolm, Vanderwel, and Kuttner. Ontario Ministry of Natural Resources, \$15,000. (50% authorship of proposal, 100% contribution to my research)
2005. Projected tree distributions, tree migration rates, and forest types in Ontario under 2° global warming. Malcolm. World Wildlife Fund-U.S., \$5,800. (Sole author of proposal, 100% contribution to my research)
- 2004-2005. Ecology of sympatric flying squirrel species (*Glaucomys* spp.) in Haliburton Forest. Malcolm and Holloway. Brown Fund, Haliburton Forest, \$15,000. (Sole author of proposal, 100% contribution to my research)
- 2004-2007. Multi-cohort stand structure, dynamics, and associated wildlife communities in boreal northeastern Ontario. Malcolm, Casperson, Drapeau, Smith, and Thompson. Tembec, Inc., \$50,000. (Sole author of proposal, 100% contribution to my research)
- 2004-2007. Multi-cohort stand structure, dynamics, and associated wildlife communities in boreal northeastern Ontario. Malcolm, Casperson, Drapeau, Smith, and Thompson. Ontario Ministry of Natural Resources, \$15,000. (Sole author of proposal, 100% contribution to my research)
- 2004-2007. Multi-cohort stand structure and dynamics and associated wildlife communities in boreal northeastern Ontario. Malcolm, Casperson, Smith, Drapeau, and Thompson. Lake Abitibi Model Forest, \$30,000. (Sole author of proposal, 100% contribution to my research)
- 2003-2004. Adaptive responses to climate change-induced tree migration in Ontario. Malcolm, Scott, Pinto, Carleton, Kruus, and Maycock. Living Legacy Trust, \$106,835. (Sole author of proposal, 100% contribution to my research)
- 2003-2004. Multi-scale habitat associations of the American marten (*Martes americana*) in Haliburton Forest. Malcolm. Brown Fund, Haliburton Forest, \$17,500. (Sole author of proposal, 100% contribution to my research)
- 2003-2004. Adaptive responses to climate change-induced tree migration in Ontario. Malcolm, Scott, Pinto, Carleton, Kruus, and Maycock. David Suzuki Foundation, \$10,000. (Sole author of proposal, 100% contribution to my research)
- 2003-2004. Multi-scale habitat selection by flying squirrels in the Great Lakes-St. Lawrence region of Ontario. Malcolm, Holloway, Naylor, Cumming, and Stabb. Living Legacy Trust, Ontario Ministry of Natural Resources, \$33,787. (50% authorship of proposal, 100% contribution to my research)
- 2002-2004. Effects of brazil nut harvesting on the ecology of spiny rats. Solorzano-Filho and Malcolm. Wildlife Conservation Society, \$17,000. (75% authorship of proposal, 100% contribution to my research)
2002. Vulnerability of global biodiversity hotspots to climate change. Malcolm. Conservation International, \$6,670. (Sole author of proposal, 100% contribution to my research)
- 2002-2004. Multi-scale habitat selection by northern flying squirrels in the Great Lakes-St. Lawrence region of Ontario. Malcolm, Holloway, Naylor, Cumming, and Stabb. Living Legacy Trust, Ontario Ministry of Natural Resources, \$65,360. (50% authorship of proposal, 100% contribution to my research)

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- 2001-2003. Mammal communities and the ecological consequences of selective logging. Malcolm, Lambert, Zimmerman, and Jerozolinski. National Geographic Society, \$21,700. (75% authorship of proposal, 100% contribution to my research)
- 2001-2003. Impacts of interacting disturbances on central African mammals. Remis, Ray, and Malcolm. World Wildlife Fund, \$26,560. (25% authorship of proposal, 25% contribution to my research)
- 2002-2006. Impacts of logging on biodiversity in the Great Lakes-St. Lawrence forest of northeastern Ontario. Malcolm. NSERC, \$88,000. (Sole author of proposal, 100% contribution to my research)
- 2001-2004. Multi-scale habitat selection by American martens in the Great Lakes-St. Lawrence forests of Central Ontario. Malcolm, Naylor, Cumming, Ray, and Nagel. Living Legacy Trust, Ontario Ministry of Natural Resources, \$54,740. (50% authorship of proposal, 100% contribution to my research)
- 2000-2004. Conservation and development alliances with tropical forest indigenous peoples. Zimmerman and Malcolm. Donner Canada Foundation, \$200,000. (25% authorship of proposal, 100% contribution to my research).
- 2000-2003. Biodiversity in eastern mixed-wood forest canopies. Smith, Malcolm, Thomas, Schleifenbaum, Darling, and Hutchinson. Richard Ivey Foundation, \$131,000. (15% authorship of proposal, 30% contribution to my research).
- 2000-2002. Integrated fire and forest management in the boreal forest. Martell, Hirsch, Malcolm, McApline, and Weintraub. Sustainable Forest Management Network, National Centres of Excellence, \$115,000. (25% authorship of proposal, 25% contribution to my research).
- 2000-2001. Migration rates and biodiversity loss under global warming. Malcolm. World Wildlife Fund-U.S., \$50,000. (Sole author of proposal, 100% contribution to my research)
- 2000-2001. Migration rates and biodiversity loss under global warming. Malcolm. David Suzuki Foundation, \$7,500. (Sole author of proposal, 100% contribution to my research)
- 1999-2000. Potential natural vegetation as a guide to woodland conservation and enhancement. Kenney, Malcolm, and Csillig. EJLB Foundation, \$70,000. (10% authorship of proposal, 25% contribution to my research)
- 1997-1999. Practical implementation of sustainable management and conservation of biodiversity in Ontario northern hardwood/conifer and boreal forests. Bryan, Malcolm, and Carleton. Richard Ivey Foundation, \$155,000. (40% authorship of proposal, 67% contribution to my research)
- 1998-1999. Impacts of logging practices on biodiversity in the Great Lakes-St. Lawrence/boreal ecotone of northeastern Ontario. Malcolm, Carleton, and Ray. Wildlife Habitat Canada, \$18,000. (40% authorship of proposal, 67% contribution to my research)
- 1998-2001. Impacts of logging on biodiversity in the Great Lakes-St. Lawrence/boreal ecotone of northeastern Ontario. Malcolm. NSERC, \$77,605. (Sole author of proposal, 100% contribution to my research)
1998. Assessing the threats of climate change to globally significant ecoregions. Malcolm. World Wildlife Fund-U.S., \$15,280. (Sole author of proposal, 100% contribution to my research)
1998. Ethnocultural Initiatives. Wilson, Zimmerman, and Malcolm. University of Toronto, \$7,500. (10% author of proposal, 10% contribution to my teaching)
- 1998-2000. Landscape comparison of ecological communities along gradients of variable-retention harvesting in lowland black spruce sites. Smith, Malcolm, and Carleton. Lake Abitibi Model Forest, \$87,000. (33% authorship of proposal, 100% contribution to my research)

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- 1997-1998. Impacts of logging on biodiversity in the Great Lakes-St. Lawrence/boreal ecotone of northeastern Ontario. Malcolm. University of Toronto Connaught Fund, \$27,000. (Sole author of proposal, 100% contribution to my research)
1997. A review of the potential effects of global warming on Canadian forests. Martell and Malcolm. Canada Country Collaborative Research Grant, \$10,000. (25% authorship of proposal, 100% contribution to my research)
1995. Effects of selective logging on mahogany regeneration. Zimmerman and Malcolm. U.S. Forest Service, \$6,000. (50% authorship of proposal, 100% contribution to my research)
- 1993-1994. Effects of selective logging on central African small mammal communities, forest structure, and tree diversity. Malcolm. National Geographic Society, \$9,060. (Sole author of proposal, 100% contribution to my research)
- 1993-1994. Effects of selective logging on central African small mammal communities, forest structure, and tree diversity. Malcolm. Wildlife Conservation Society, \$9,120. (Sole author of proposal, 100% contribution to my research)
- 1991-1992. Ecological and evolutionary significance of Amazonian river barriers. Patton, Peres, Malcolm, da Silva. National Geographic Society, \$25,000. (Sole author of proposal, 50% contribution to my research)
- 1991-1992. Ecological and evolutionary significance of Amazonian river barriers. Malcolm, Patton, Peres, da Silva, Gascon. Wildlife Conservation Society, \$56,000. (Sole author of proposal, 33% contribution to my research)
- 1987-1989. Small mammals of tropical forest fragments: pattern and process. Malcolm. National Geographic Society, \$9,300. (Sole author of proposal, 50% contribution to my research)
- 1984-1988. Small mammals of tropical forest fragments: pattern and process. Malcolm. World Wildlife Fund-U.S., BDFF Project, \$69,000. (Sole author of proposal, 50% contribution to my research)
- 1987-1988. Small mammals of tropical forest fragments: pattern and process. Malcolm. Sigma Xi Grant-in-Aid-of-Research, \$400. (Sole author of proposal, 50% contribution to my research)
1985. Small mammals of tropical forest fragments: pattern and process. Malcolm. Tinker Summer Research Award, \$1,200. (Sole author of proposal, 50% contribution to my research)

## SCHOLARLY AND PROFESSIONAL WORK

### **Publications (graduate students, postdocs, and journal names in bold font):**

#### Chapters in Books:

- Mendes-Oliveira, A. M., M. L. O. Oliveira Borges, T. **Lambert**, M. Santos-Filho, H. Bergallo, N. Ardente, S. L. Silva de Maria, and J. R. Malcolm. 2015. Efeitos antrópicos sobre comunidades de pequenos mamíferos não-voadores na Amazônia Brasileira. Pp. 257-274 In: Pequenos Mamíferos Não-voadores da Amazônia Brasileira (A. M. Mendes-Oliveira and L. M. Miranda, eds.), Sociedade Brasileira de Mastozoologia, Museu Nacional, Rio de Janeiro.
- Ray, J. C., and J. R. Malcolm. 2013. Species account for *Deomys ferrugineus*. Pp. 237-238 In: Mammals of Africa, Volume III (J. Kingdon, D. Happold, T. Butynski, M. Hoffmann, M. Happold, and J. Kalina, eds.), Bloomsbury Publishing Inc., New York, 784 pp.
- Ray, J. C., and J. R. Malcolm. 2013. Species account for *Hylomyscus aeta*. Pp. 430-431 In: Mammals of Africa, Volume III (J. Kingdon, D. Happold, T. Butynski, M. Hoffmann, M. Happold, and J. Kalina, eds.), Bloomsbury Publishing Inc., New York, 784 pp.

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- Ray, J. C., and J. R. Malcolm. 2013. Species account for *Heimyscus fumosus*. Pp. 418-420 In: Mammals of Africa, Volume III (J. Kingdon, D. Happold, T. Butynski, M. Hoffmann, M. Happold, and J. Kalina, eds.), Bloomsbury Publishing Inc., New York, 784 pp.
- Ray, J. C., and J. R. Malcolm. 2013. Genus account for *Deomys*. P. 235 In: Mammals of Africa, Volume III (J. Kingdon, D. Happold, T. Butynski, M. Hoffmann, M. Happold, and J. Kalina, eds.), Bloomsbury Publishing Inc., New York, 784 pp.
- Ray, J. C., and J. R. Malcolm. 2013. Genus account for *Heimyscus*. P. 418 In: Mammals of Africa, Volume III (J. Kingdon, D. Happold, T. Butynski, M. Hoffmann, M. Happold, and J. Kalina, eds.), Bloomsbury Publishing Inc., New York, 784 pp.
- Malcolm, J.R., J. L. Patton, and M. N. F. da Silva. 2005. Small mammal communities in upland and floodplain forests along an Amazonian white-water river. Pp. 335-380 In: Mammalian Diversification: From Chromosomes to Phylogeography (A Celebration of the Career of James L. Patton) (E. A. Lacey and P. Myers, eds.). University of California Publications in Zoology, Volume 133, 383 pp.
- Malcolm, J. R., A. Markham, R. P. Neilson, and M. Garaci. 2005. Case study: migration of vegetation types in a greenhouse world. Pp. 252-255 In: Climate Change and Biodiversity (T. E. Lovejoy and L. Hannah, eds.), Yale University Press, New Haven.
- Malcolm, J. R. 2004. Ecology and conservation of canopy mammals. Pp. 297-331 In: Forest canopies (2<sup>nd</sup> Edition). (M. D. Lowman and H. B. Rinker, eds.). Elsevier Academic Press, New York.
- Malcolm, J. R. 2001. Extending models of edge effects to diverse landscape configurations, with a test case from the Neotropics. Pp. 346-357 In: Lessons from Amazonia: The Ecology and Conservation of a Fragmented Forest (R. O. Bierregaard, Jr., C. Gascon, T. E. Lovejoy, and R. Mesquita, eds.). Yale University Press, New Haven, 478 pp.
- Bierregaard, Jr., R. O., W. F. Laurance, C. Gascon, J. Benitz-Malvido, P. Fearnside, C. R. Fonseca, G. Ganade, J. R. Malcolm, M. B. Martins, S. Mori, M. Oliveira, J. Rankin-de Mérona, A. Scariot, W. Spironello, and B. Williamson. 2001. Principles of forest fragmentation and conservation in the Amazon. Pp. 371-385 In: Lessons from Amazonia: The Ecology and Conservation of a Fragmented Forest (R. O. Bierregaard, Jr., C. Gascon, T. E. Lovejoy, and R. Mesquita, eds.). Yale University Press, New Haven, 478 pp.
- Malcolm, J. R. 2001. Unifying the study of fragmentation: external vs. internal forest fragmentation. Pp 136-138 In: The Cutting Edge: Conserving Wildlife in Logged Tropical Forests (R. Fimbel, A. Grajal, and J. Robinson, eds.). Columbia University Press, New York.
- Zimmerman, B., J. R. Malcolm, and P. Scheffler. 2000. Biological indicators of the sustainability of selective logging in the eastern Amazon [in Spanish]. Pp 161-192 In: Seguimiento y Evaluación del Manejo de Recursos Naturales (J. A. Berdegúe and G. Escobar, eds.). Fundación de Comunicaciones del Agro, FUCOA, Santiago, Chile.
- Malcolm, J. R. 1997. Insect biomass in Amazonian forest fragments. Pp 510-533 In: Canopy arthropods (N. E. Stork, J. Adis, and R. K. Didham, eds.). Chapman & Hall, London.
- Malcolm, J. R. 1997. Biomass and diversity of small mammals in Amazonian forest fragments. Pp 207-221 In: Tropical Forest Remnants: Ecology, Management and Conservation of Fragmented Communities (W. F. Laurance and R. O. Bierregaard, Jr., eds.). University of Chicago Press, Chicago.
- Markham, A. and J. R. Malcolm, 1996. Biodiversity and Wildlife Conservation: Adaptation to Climate Change. Pp 384-401 In: Adaptation to Climate Change: Assessment and Issues. (Smith, J., N. Bhatti, G. Menzhulin, R. Benioff, M. Campos, B. Jallow, and F. Rijsberman, eds.). Springer-Verlag, New York.
- Malcolm, J. R. 1995. Forest structure and the abundance and diversity of Neotropical small mammals. Pp 179-197 In: Forest Canopies (M. D. Lowman and N. M. Nadkarni, eds.). Academic Press, New York.

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- Malcolm, J. R. and R. J. Brooks. 1993. Cyclic variation in skull-body regressions of collared lemmings: differential representation of seasonal cohorts. Pp. 135-155 In: The Biology of Lemmings (N. C. Stenseth and R. A. Ims, eds.). Academic Press.
- Malcolm, J. R. and R. J. Brooks. 1993. The adaptive significance of photoperiod-induced shape changes in the collared lemming, Dicrostonyx richardsoni. Pp. 311-328 In: The Biology of Lemmings (N. C. Stenseth and R. A. Ims, eds.). Academic Press.
- Malcolm, J. R. 1990. Estimation of mammalian densities in continuous forest north of Manaus. Pp. 339-357 In: Four Neotropical Rainforests (A. Gentry, ed.). Yale University Press, New Haven.
- Lovejoy, T. E., R. O. Bierregaard, Jr., A. B. Rylands, J. R. Malcolm, C. E. Quintela, L. H. Harper, K. S. Brown, Jr., A. H. Powell, G. V. N. Powell, H. O. R. Schubart, and M. B. Hays. 1986. Edge and other effects of isolation of Amazon forest fragments. Pp. 257-285 In: Conservation Biology (M. E. Soulé, ed.). Sinauer Associates, Inc., Sunderland, Massachusetts.

#### Articles in Refereed Journals:

- Malcolm, J. R., K. Valenta, and S. M. Lehman. In press. Edge effects in tropical dry forests of Madagascar: additivity or synergy? **Landscape Ecology** (accepted October 2016).
- Dennis, R.W. J., J. R. Malcolm, S. M. Smith, and M. I. Bellocq. In press. Response of saproxylic insect communities to logging history, tree species, stage of decay, and wood posture in the central Nearctic boreal forest. **Journal of Forestry Research** (accepted April 2016).
- Barkley, E. P., J. R. Malcolm, S. M. Smith, and M. I. Bellocq. 2016. Does variable stand structure in the central Nearctic boreal forest associated with multi-cohort management support diversity in ground beetle (Coleoptera, Carabidae) communities? **Journal of Forestry Research** 27:1191-1202.
- Norghauer, J. M., C. M. Free, R. M. Landis, J. Grogan, J. R. Malcolm, S. C. Thomas, and B. L. Zimmerman. 2016. Herbivores limit the population size of big-leaf mahogany trees in an Amazonian forest. **Oikos** 125:137-148.
- Gompper, M. E., D. Lesmeister, J. C. Ray, J. R. Malcolm, and R. Kays. 2016. Differential habitat use or intraguild interactions: what structures a carnivore community? **PLoS ONE** 11(1):1-18 (e0146055).
- Venier, L. A., I. Thompson, R. Fleming, J. R. Malcolm, I. Aubin, J.A. Trofymow, D. Langor, R. Sturrock, C. Patry, R.O. Outerbridge, S.B. Holmes, S. Haeussler, L. De Grandpré, H. Chen, E. Bayne, A. Arsenault, and J. P. Brandt. 2014. Effects of natural resource development on the terrestrial biodiversity of Canadian boreal forests. **Environmental Reviews** 22: 457-490.
- Boan, J. J., J. R. Malcolm, and B. E. McLaren. 2014. Forest overstorey and age as habitat? Detecting the indirect and direct effects of predators in defining habitat in a harvested boreal landscape. **Forest Ecology and Management** 326:101-108.
- Boan, J. J., B. E. McLaren, and J. R. Malcolm. 2013. Predicting non-inventoried forest elements using forest inventory data: the case of winter forage for woodland caribou. **Ecoscience** 20:1-11.
- Burrell, M. V. A., J. R. Malcolm, and P. Drapeau. 2013. Multicohort stand structure as a coarse filter of variation in mixedwood boreal bird communities. **Forestry Chronicle** 89:37-49.
- Kuttner, B., J. R. Malcolm, and S. M. Smith. 2013. Multi-cohort stand structure in boreal forests of northeastern Ontario: relationships with forest age, disturbance history, and deadwood features. **Forestry Chronicle** 89:1-13.
- Cross, M. S., E. S. Zavaleta, D. Bachelet, M. L. Brooks, C. A. F. Enquist, E. Fleishman, L. Graumlich, C. R. Groves, L. Hannah, L. Hansen, G. Hayward, M. Koopman, J. J. Lawler, J. R. Malcolm, J. Nordgren, B. Petersen, E. L. Rowland, D. Scott, S.L. Shafer, M. R. Shaw, and G. M. Tabor. 2012. The Adaptation for Conservation Targets (ACT) framework: a tool for incorporating climate change into natural resource management. **Environmental Management** 50:341-351.

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- Richmond, S., E. Nol, D. Burke, and J. R. Malcolm.** 2012. Effects of single-tree selection harvesting on Rose-breasted Grosbeak (*Pheucticus leudovicianus*) demography in a northern hardwood forest. **Forest Ecology and Management** 276: 24-32.
- Vanderwel, M. C., J. R. Malcolm, and J. P. Caspersen.** 2012. Using a data-constrained model of home range establishment to predict abundance in spatially heterogeneous habitats. **PLOS ONE** 7(7): 1-11.
- Fischer, A.L., J.-M. Moncalco, J. N. Klironomos, and J. R. Malcolm. 2012. Fruiting body and molecular rDNA sampling of fungi in woody debris from logged and unlogged boreal forests in northeastern Ontario. **Ecoscience** 19: 374-390.
- Chaundy-Smart, R. F., S. M. Smith, J. R. Malcolm, and M. I. Bellocq. 2012. Comparison of moth communities following clear-cutting and wildfire disturbance in the southern boreal forest. **Forest Ecology and Management** 270:273-281.
- Berch, S.M., D. Morris, and J. R. Malcolm. 2011. Intensive forest biomass harvesting and biodiversity in Canada: a summary of relevant issues. **Forestry Chronicle** 87:478-487.
- Boan, J. J., B. E. McLaren, and J. R. Malcolm. 2011. Influence of post-harvest silviculture on understory vegetation: implications for forage in a multi-ungulate system. **Forest Ecology and Management** 262:1704-1712.
- Garroway, C. J., J. Bowman, T. J. Cascaden, G. L. **Holloway**, J. R. Malcolm, and P. J. Wilson. 2011. The genetic signature of rapid range expansion by flying squirrels in response to contemporary climate warming. **Global Change Biology** 17:1760–1769.
- Vanderwel, M. C., J. P. Caspersen, J. R. Malcolm, M. J. Papaik, and C. Messier.** 2011. Structural changes and potential vertebrate responses following simulated partial harvesting of boreal mixedwood stands. **Forest Ecology and Management** 261:1362-1371.
- Vanderwel, M. C., J. R. Malcolm, J. P. Caspersen, and M. A. Newman.** 2010. Fine-scale habitat associations of red-backed voles in boreal mixedwood stands. **Journal of Wildlife Management** 74:1492-1501.
- Garroway, C. J., J. Bowman, G. L. **Holloway**, J. R. Malcolm, C. Mahan, T. McEachen, M. A. Steele, G. Turner, and P. J. Wilson. 2010. Climate change induced hybridization in flying squirrels. **Global Change Biology** 16:113-121.
- Patterson, J. E. H. and J. R. Malcolm.** 2010. Landscape structure and local habitat characteristics as correlates of *Glaucomys sabrinus* and *Tamiasciurus hudsonicus* occurrence. **Journal of Mammalogy** 91:642-653.
- Norghauer, J. M., J. Grogan, J. R. Malcolm, and J. M. Felfili.** 2010. Long-distance seed dispersal helps big-leaf mahogany seedlings escape defoliation by a specialist caterpillar. **Oecologia** 162:405-412.
- Vanderwel, M. C., J. R. Malcolm, and S. M. Smith.** 2009. Long-term snag and downed woody debris dynamics under periodic surface fire, fire suppression, and shelterwood management. **Canadian Journal of Forest Research** 39:1709-1721.
- Vanderwel, M. C., S. C. Mills, and J. R. Malcolm.** 2009. Effects of partial harvesting on vertebrate species associated with late-successional forests in Ontario's boreal region. **Forestry Chronicle** 85: 91-104.
- Norghauer, J. M., J. R. Malcolm, B. L. Zimmerman, and J. M. Felfili.** 2008. Experimental establishment of big-leaf mahogany (*Swietenia macrophylla* King) seedlings on two soil types in native forest of Para, Brazil. **Forest Ecology and Management** 255:282-291.
- Gardner, T. A., J. Barlow, I. S. Araujo, T. C. Ávila-Pires, A. B. Bonaldo, N. F. Lo-Man-Hung, J. E. Costa, M. C. Esposito, L. V. Ferreira, J. Hawes, M. I. M. Hernández, M. S. Hoogmoed, R. N. **Leite**, J. R. Malcolm, M. B. Martins, L. A. M. Mestre, W. L. Overal, L. T. W. Parry, S. Peters, M. A. Ribeiro-Junior, M. N. F. da Silva, C. da Silva Motta, and C. A. Peres. 2008. The cost-effectiveness of biodiversity surveys in tropical forests. **Ecology Letters** 11: 139-150.

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- Norghauer, J., J. R. Malcolm, and B. L. Zimmerman. 2008. Canopy cover mediates interactions between a specialist caterpillar and seedlings of a Neotropical tree. **Journal of Ecology** 96:103-113.
- Deans, A. M., S. M. Smith, J. R. Malcolm, W. J. Crins, and M. I. Bellocq. 2007. Hoverfly (Syrphidae) communities respond to varying structural retention following harvesting in Canadian peatland black spruce forests. **Environmental Entomology** 36: 308-318.
- Patterson, J. E. H., S. J. Patterson, and J. R. Malcolm. 2007. Cavity nest materials of Northern Flying Squirrels, *Glaucomys sabrinus*, and North American Red Squirrels, *Tamiasciurus hudsonicus*, in a secondary hardwood forest of southern Ontario. **Canadian Field-Naturalist** 121:303-307.
- Vanderwel, M.C., J.R. Malcolm, and S.C. Mills. 2007. A meta-analysis of forest bird responses to partial harvesting across North America. **Conservation Biology** 21:1230-1240.
- Vance, C. C., S. M. Smith, J. R. Malcolm, J. Huber, and M. I. Bellocq. 2007. Differences between forest type and vertical strata in the diversity and composition of hymenopteran families and mymarid genera in northeastern temperate forests. **Environmental Entomology** 36:1074-1083.
- Barlow, J., T. A., Gardner, I. S. Araujo, T. C. Ávila-Pires, A. B. Bonaldo, J. E. Costa, M. C. Esposito, L. V. Ferreira, J. Hawes, M. I. M. Hernandez, M. S. Hoogmoed, R. N. Leite, N. F. Lo-Man-Hung, J. R. Malcolm, M. B. Martins, L. A. M. Mestre, R. Miranda-Santos, A. L. Nunes-Gutjahr, W. L. Overal, L. Parry, S. L. Peters, M. A. Ribeiro-Junior, M. N. F. da Silva, C. da Silva Motta, and C. A. Peres. 2007. Quantifying the biodiversity value of tropical primary, secondary, and plantation forests. **Proceedings of the National Academy of Sciences** 104:18555-18560.
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- Holloway, G.L. and Malcolm, J.R. 2007. Nest tree use by northern and southern flying squirrels in central Ontario. **Journal of Mammalogy** 88:226-233.
- Holloway, G.L. and Malcolm, J.R. 2007. Northern and southern flying squirrel use of space within home ranges in central Ontario. **Forest Ecology and Management** 242:747-755.
- Holloway, G. L. and J. R. Malcolm. 2006. Sciurid habitat relationships in forests managed under selection and shelterwood silviculture in Ontario. **Journal of Wildlife Management** 70:1735-1745.
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- Lambert, T. D., Malcolm, J. R., and B. L. Zimmerman. 2006. Amazonian small mammal abundances in relation to habitat structure and resource abundance. **Journal of Mammalogy** 87:766-776.
- Peters, S. L., J. R. Malcolm, and B. L. Zimmerman. 2006. Effects of selective logging on bat communities in the southeastern Amazon. **Conservation Biology** 20:1410-1421.
- Vanderwel, M. C., J. R. Malcolm, S. M. Smith, and N. Islam. 2006. Insect community composition and trophic guild structure in decaying logs from eastern Canadian pine-dominated forests. **Forest Ecology and Management** 225: 190-199.
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- Lambert**, T. D., J. R. Malcolm, and B. L. Zimmerman. 2005. Effects of mahogany (*Swietenia macrophylla*) logging on small mammal communities, habitat structure, and seed predation in the southeastern Amazon Basin. **Forest Ecology and Management** 206:381-398.
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- Deans**, A. M., J. R. Malcolm, S. M. Smith, and T. J. Carleton. 2003. A comparison of forest structure among old-growth, variable retention harvested, and clearcut peatland black spruce (*Picea mariana*) forests in boreal northeastern Ontario. **Forestry Chronicle** 79:579-589.
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- Zimmerman, B., C. A. Peres, J. R. Malcolm, and T. Turner. 2001. Conservation and development alliances with the Kayapó of south-eastern Amazonia, a tropical forest indigenous people. **Environmental Conservation** 28:10-22.
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- Malcolm J. R. 1998. A model of conductive heat flow in forest edges and fragmented landscapes. **Climatic Change** 39:487-502.
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- Malcolm, J. R. 1994. Edge effects in central Amazonian forest fragments. **Ecology** 75: 2438-2445.
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- Malcolm, J. R. 1991. Comparative abundances of Neotropical small mammals by trap height. **Journal of Mammalogy** 72:188-192.
- Malcolm, J. R. 1988. Small mammal abundances in isolated and non-isolated primary forest reserves near Manaus, Brazil. **Acta Amazonica** 18:67-83.
- Malcolm, J. R., R. J. Brooks, and J. P. Bogart. 1985. Chromosomes and sex ratio of the collared lemming, *Dicrostonyx richardsoni*. **Canadian Journal of Zoology** 64:12-15.
- Malcolm, J. R. and R. J. Brooks. 1985. Influence of photoperiod and photoperiod reversal on growth, longevity, and indicators of age of *Dicrostonyx groenlandicus*. **Canadian Journal of Zoology** 63:1497-1509.
- Lynn, D. H. and J. R. Malcolm. 1982. A multivariate study of morphometric variation in species of the ciliate genus *Colpoda* (Ciliophora: Colpodida). **Canadian Journal of Zoology** 61:307-316.
- Malcolm, J. R. and R. J. Brooks. 1981. Eye lens weight and body size as criteria of age in beaver. **Canadian Journal of Zoology** 59:1189-1192.

#### Popular Articles:

- Malcolm, J. R. and B. D. Harvey. 2013. The need for multi-cohort management in boreal forests. **Forestry Chronicle** 89:271-274.
- Malcolm, J. R. 2008. Forest biomass: a low-hanging fruit? **Tomorrow's Forest** (The Sustainable Forest Management Network Newsletter), Spring 2008.
- Contributor. 2004. National Geographic Atlas of the World, 8<sup>th</sup> Edition. National Geographic Society.
- Contributor. 2002. Our burdened earth. **National Geographic Magazine**, Map Supplement.
- Malcolm, J. R., A. Markham, and R. P. Neilson. 2001. Can species keep up with climate change? **Conservation Biology in Practice** 2(2):24-25.
- Malcolm, J. R. 1998. High roads to oblivion. **Natural History** 7/8:46-49.

#### Technical Reports:

- Puric-Mladenovic**, D., J. R. Malcolm, H. Shi, S. Strobl, and J. Buck. 2011. An analysis of the vulnerabilities of terrestrial ecosystems/vegetation cover to climate change in the Lake Simcoe

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Malcolm

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- watershed. 22 pp. + Appendices. Part of the Lake Simcoe Watershed Sectoral Vulnerability Assessments (Policy 7.11 of the Lake Simcoe Protection Plan).
- Neilson, E. A., G. G. Sherman, J. R. Malcolm, and S. C. Thomas. 2008. Combating climate change through boreal forest conservation: resistance, adaptation, and mitigation. Greenpeace Canada, Toronto.
- Malcolm, J. R., D. **Puric-Mladenovic**, and H. **Shi**. 2005. Projected tree distributions, tree migration rates, and forest types in Ontario under a 2°C global temperature rise. Pp. 52-99 In: Implications of a 2°C global temperature rise for Canada's natural resources (T. Tin, ed.). WWF-World Wide Fund For Nature, Gland, Switzerland.
- Malcolm, J. R., D. **Puric-Mladenovic**, and H. **Shi**. 2005. Implications of climate change on disturbance regimes, carbon stocks, management and biodiversity of Canada's boreal forests. Pp. 100-109 In: Implications of a 2°C global temperature rise for Canada's natural resources (T. Tin, ed.). WWF-World Wide Fund For Nature, Gland, Switzerland.
- Malcolm, J. R., C. Liu, L. B. Miller, T. Allnut, and L. Hansen. 2002. Habitats at risk: global warming and species loss in globally significant terrestrial ecosystems. World Wildlife Fund, 39 pp.
- Malcolm, J. R. and L. F. Pitelka. 2000. Ecosystems and global climate change: A review of potential impacts on U.S. terrestrial ecosystems and biodiversity. Pew Center on Global Climate Change, 41 pp.
- Malcolm, J. R. and A. Markham. 2000. Global warming and terrestrial biodiversity decline. World Wildlife Fund, 34 pp.
- Markham, A. and J. R. Malcolm. 2000. Speed kills: rates of climate change are threatening biodiversity. World Wildlife Fund, 6 pp.
- Malcolm, J. R., A. W. Diamond, A. Markham, F. X. Mkanda, and A. M. Starfield. 1998. Biodiversity: species, communities, and ecosystems. Pages 13.1-13.41 In: Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies, Version 2.0 (Feenstra, J. F., I. Burton, J. B. Smith, R. S. J. Tol, eds.). United Nations Environmental Program.
- Saporta, R., J. R. Malcolm, and D. L. Martell. The impact of climate change on Canadian forests. Sector Chapter In: Canada Country Study on Climate Change Impacts, Environment Canada.
- Contributing author. 1998. North America. Pp. 253-330 In: The regional impacts of climate change: an assessment of vulnerability. Special report of IPCC Working Group II, Cambridge University Press, 517 pp.
- Malcolm, J. R. and A. Markham. 1997. Climate change threats to the National Parks and protected areas of the United States and Canada. World Wildlife Fund, 94 pp.
- Malcolm, J. R. 1997. The demise of an ecosystem: arctic wildlife in a changing climate. World Wildlife Fund, 16 pp.
- Malcolm, J. R. 1996. Changes in ungulate diversity. Pp. 55-61 In: Climate Change and Southern Africa: An Exploration of Some Potential Impacts and Implications in the SADC Region. Climate Research Unit, University of East Anglia and WWF International.
- Malcolm, J. R. 1996. Wildlife and biodiversity. Pp. 11.1-11.28 In: Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies (Version 1.0). U. N. Environmental Program.

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**Workshops Organized:**

- 2011. Boreal Multi-cohort Forest Management Workshop: A Workshop and Associated Special Issue of the Forestry Chronicle, Cochrane, Ontario (Sponsored by the Canadian Institute of Forestry and the Forestry Research Partnership).
- 2010. Multi-cohort Stand Structural Classification Using LiDAR, Faculty of Forestry, University of Toronto.
- 2008. Enhanced Forest Productivity Workshop (Multi-cohort Forest Management), Faculty of Forestry, University of Toronto.
- 2008. Sustainable Forest Management (NCE) Workshop (Ecological Roles of Coarse Woody Debris), Faculty of Forestry, University of Toronto.
- 2007. Enhanced Forest Productivity Workshop (Multi-cohort Forest Management), Faculty of Forestry, University of Toronto.
- 2007. Sustainable Forest Management (NCE) Workshop (Ecological Roles of Coarse Woody Debris), Faculty of Forestry, University of Toronto.
- 2005. Enhanced Forest Productivity Workshop (Multi-cohort Forest Management), Faculty of Forestry, University of Toronto.
- 2005. Sustainable Forest Management (NCE) Workshop (Ecological Roles of Coarse Woody Debris), Faculty of Forestry, University of Toronto.

**Oral Presentations:**

Invited Presentations:

- 2014. International Conference on Development, Biodiversity and Climate Change: Issues and Challenges. Chamba, India (**Van Schie** and Malcolm).
- 2012. Biomass/Biodiversity Workshop (Great Lakes Forestry Centre), Sault Ste. Marie, ON.
- 2011. Canadian Mathematical Society, Winter Meeting, Toronto, ON (**Hayashi**, Malcolm, **Kramm**, **Puric-Mladenovic**, and **Shi**).
- 2011. Forests for the future: a scientific symposium for high school students, Royal Botanical Garden, Burlington, ON.
- 2011. Guelph Biomathematics and Biostatistics (BioM&S) Symposium, Climate Change and Ecology: a Mathematical & Statistical Perspective, Guelph, ON.
- 2011. Ecological Society of America Annual Meeting, Austin, Texas (**Hayashi**, Malcolm, **Kramm**, **Puric-Mladenovic**, and **Shi**).
- 2011. Boreal Forest Changes 2011 Conference, Chapleau Cree First Nation, Chapleau, ON.
- 2009. Guest speaker at event to prepare student delegates for the Copenhagen talks, Milton, ON.
- 2009. Entomological Societies of Canada and Manitoba, Winnipeg, MB (Malcolm and Smith).
- 2009. Zoological Education Trust Public Lecture, 48<sup>th</sup> Annual Meeting of Canadian Society of Zoologists, Toronto, ON.
- 2009. Faculty Seminar, Faculty of Forestry and the Forest Environment, Lakehead University, Thunder Bay, Ontario.
- 2009. Toronto and Area Council of Women, Toronto, ON.
- 2009. Far North Science Advisory Panel, Fourth Meeting, Barrie, ON.
- 2009. Sustainable Forest Management Network, Forest Futures Project, Toronto, ON.
- 2009. Invitation to Action and Solutions: Boreal Forest Customer & Investor Roundtable, Greenpeace Canada, Toronto, ON.
- 2008. Ontario Professional Foresters Association 2008 Conference and Annual General Meeting Forestry: a Changing Climate, Thunder Bay, ON.
- 2008. The State of Science on Forest Carbon Management in Canada, Pollution Probe, Toronto, ON.

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- 2008. Climate Change Workshop – Adapting our natural areas to climate change, Mississauga, ON.
- 2008. Paper Futures 2008: Leading the Way to a Green Bottom Line, Market Initiatives, Toronto, ON.
- 2008. Boreal Wildlife Day, Wildlife Conservation Society Canada, Toronto, ON.
- 2008. The Scientific Foundation for Sustainable Forest Biomass Harvesting: Guidelines and Policy, Toronto, ON (Malcolm, Bell, Berch, Chapman, Morris, Newmaster, Puddister, and Thompson).
- 2007. Making Green Connections: Creating Partnerships and Providing Tools for Greenways, Ontario Nature's Annual General Meeting.
- 2006. Senior Alumni Association, University of Toronto, Toronto, ON.
- 2006. A.D. Latonnell Conservation Symposium, Alliston, ON.
- 2006. Continuing Studies Seminar Series, Mississauga Public Library, Toronto, ON.
- 2006. CBC Future of Climate Change Workshop (Fifth Estate), Toronto, ON.
- 2006. Later Life Learning, University of Toronto, Toronto, ON.
- 2004. Species at Risk: Pathways to Recovery, Victoria, BC.
- 2004. Climate Change in New England and Eastern Canada: Natural Resource Impacts and Adaptation Responses, Conference of New England Governors and Eastern Canadian Premiers Symposium, Boston, Massachusetts.
- 2003. Conference on Global Climate Change and Biodiversity, Univ. of East Anglia, Norwich, U.K.
- 2003. Senate Standing Committee on Agriculture and Forestry, Senate of Canada, Ottawa, ON.
- 2003. Living Legacy Trust Biodiversity Conservation Workshop, Sault Ste. Marie, Ontario
- 2003. Climate Change in the Western and Northern Forests of Canada: Impacts and Adaptations, University of Northern British Columbia, Prince George, B.C.
- 2001. 12<sup>th</sup> Global Warming International Conference and Expo, Cambridge, UK.
- 2001. Guest Seminar, Royal Botanical Gardens, Edinburgh, UK.
- 2001. World Wildlife Fund Boreal Standards Workshop, Orangeville, Ontario.
- 2001. Department of Zoology Seminar Series, University of Guelph, Guelph, ON.
- 2001. Department of Biology Seminar Series, Carleton University, Ottawa, ON.
- 2001. Lake Abitibi Model Forest conference: New concepts and solutions in forest management (Malcolm, Ramprasad, Deans Smith, and Carleton).
- 2000. Royal Botanical Gardens, Hamilton, ON.
- 2000. Department of Geography Seminar Series, York University, ON.
- 2000. Lake Abitibi Model Forest conference: New knowledge and solutions for forest management (Smith, Malcolm, and Carleton).
- 1999. American Museum of Natural History Spring Symposium, NY (Markham and Malcolm).
- 1999. Seminar Series, Institute of Environmental Studies, University of Toronto, ON.
- 1998. Department of Biology Seminar, Trent University, ON.
- 1998. Seminar Series, Earth Observations Laboratory, Crestech, Toronto, ON.
- 1998. Forestry-Wildlife Workshop. Westwind Conference Series, Bracebridge, ON.
- 1998. Atmospheric Sciences Seminar Series, Environment Canada, Downsview, ON.
- 1997. Ecology Seminar Series, University of Toronto, Toronto, ON.
- 1996. Department of Zoology Seminar Series, University of Guelph, Guelph, ON.
- 1996. IUCN World Conservation Congress, Montreal, QE.
- 1996. Faculty of Forestry Seminar, University of Toronto, Toronto, ON.
- 1996. Conference on Scenarios of Future Biodiversity: Causes, Patterns, and Consequences, National Center for Ecological Analysis and Synthesis, University of California, Santa Barbara, CA
- 1995. Biology Departmental Seminar, University of Southern Maine, Portland, MA.
- 1995. Departmental Seminar, University of Wyoming, Laramie, WY.
- 1995. Departmental Seminar, University of Western Kentucky, Bowling Green, KY.

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- 1995. Conference on Potential impacts of Climate Change on Tropical Forest Ecosystems, San Juan, Puerto Rico.
- 1994. First International Canopy Conference, Marie Selby Botanical Gardens, Sarasota, FL.
- 1993. Ecology and Evolutionary Biology Seminar, Queen's University, Kingston, ON.
- 1991. Ecology and Evolutionary Biology Seminar, Queen's University, Kingston, ON.
- 1990. Museum Seminar, Museum of Vert. Zoology, University of California, Berkeley, CA.
- 1990. Department of Biological Sciences Seminar, Florida State University, Tallahassee, FL.
- 1989. Instituto Nacional de Pesquisa da Amazônia, Manaus, AM, Brazil.

Conferences:

- 2015. Edge effects in tropical dry forests of Madagascar: Additivity or synergy? Ecological Society of America Annual Meeting, Baltimore (Jay R. Malcolm, Kim Valenta, and Shawn M. Lehman).
- 2015. Shrew responses to experimental manipulation of downed woody debris in boreal forests. Ecological Society of America Annual Meeting, Baltimore (A. **Karve** and Jay R. Malcolm).
- 2013. 16th International Boreal Forest Research Association Conference, Edmonton, AL. (Venier, Thompson, Fleming, Malcolm, Aubin, Trofymow, Langor, Sturrock, Patry, Outerbridge, Holmes, Haeussler, Grandpré, Chen, Bayne, and Arsenault).
- 2013. Society for Conservation Biology (Malcolm, **Barkley**, **Burrell**, **Campbell**, Carleton, **Dennis**, Fischer, **Gradowski**, **Kuttner**, **Newman**, **Sherman**, **Sharkey**, **Sugar**, **Sztaba**, and **Vanderwel**), Baltimore, MD.
- 2013. Society for Conservation Biology (**Piasecik**, Malcolm, and Smith), Baltimore, MD.
- 2011. International symposium on "Dynamics and ecological services of deadwood in forest ecosystems," Rouyn-Noranda, QC (Malcolm, **Dennis**, Fischer, **Vanderwel**, Klironomos, Moncalvo, Morris, Smith, and Thompson).
- 2011. Symposium on "Predator interactions on both sides of the Pacific," American Society of Mammalogists Annual Meeting, Portland, Oregon (Gompper, Lesmeister, Ray, Malcolm, and Kays).
- 2010. IEA Bioenergy Conference, Kamloops, BC (**Iraci**, Malcolm, and Morris).
- 2009. Fifth International Colloquium on Arboreal Squirrels, Thompson Rivers University, Kamloops, BC (**Patterson** and Malcolm).
- 2009. 30th Canadian Symposium on Remote Sensing, Lethbridge, AL (**Kuttner** and Malcolm).
- 2009. Carnivores 2009: Carnivore Conservation in a Changing World, Denver, CO (Gompper, Lesmeister, Ray, Malcolm, and Kays).
- 2009. 7th North American Forest Ecology Workshop, Logan, UT (**Vanderwel**, Caspersen, and Malcolm).
- 2008. Canadian Society of Zoologists, Halifax, NS (Patterson and Malcolm).
- 2008. International Society for Arboriculture Ontario (ISAO) Conference, Niagara Falls, ON (**Puric-Mladenovic**, Malcolm, and **Shi**).
- 2008. Entomological Society of Ontario/Entomological Society of Canada Annual Meeting. Ottawa, Ontario (**Barkley**, Malcolm, and Smith).
- 2008. Do Carabidae and Diapriidae communities reflect age class distribution and structure in the boreal forest?
- 2008. Lindsay Winter Farm Woodlot Conference, Lindsay, ON (**Puric-Mladenovic**, Malcolm, and **Shi**).
- 2008. Ecological Society of America 93rd Annual Meeting, Milwaukee, WI (**Vanderwel**, Malcolm, Caspersen, and **Newman**).
- 2007. Canadian Society for Ecology and Evolution, Montreal, QC (**Sharkey** and Malcolm).
- 2007. American Society of Mammalogists, Albuquerque, NM (**Sharkey** and Malcolm).

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- 2007. The Ontario Stewardship Program Annual General Meeting and Conference, Parry Sound, Ontario (**Puric-Mladenovic**, Malcolm, and **Shi**).
- 2007. Conference on Complex Stand Structures and Associated Dynamics: Measurement Indices and Modeling Approaches; International Union of Forest Research Organizations, Sault Ste. Marie, Ontario (**Kuttner** and Malcolm)
- 2007. International Congress on a Global Vision of Forestry, Toronto (**Dennis** and Malcolm)
- 2007. International Congress on a Global Vision of Forestry, Toronto (**Kuttner** and Malcolm)
- 2007. International Congress on a Global Vision of Forestry, Toronto (**Sharkey** and Malcolm)
- 2007. International Congress on a Global Vision of Forestry, Toronto (**Vanderwel**, Malcolm, and Caspersen)
- 2007. International Union of Forest Research Organizations, Sault St. Marie, ON (**Vanderwel**, Caspersen, and Malcolm)
- 2006. International Congress on Cultivated Forests, Bilbao, Spain (Barlow et al.)
- 2006. International Congress on Cultivated Forests, Bilbao, Spain (Gardner et al.)
- 2006. Ontario Ecology and Ethology Colloquium (**Norghauer**, Malcolm, and Zimmerman).
- 2006. American Society of Mammalogists (**Holloway** and Malcolm)
- 2005. Canadian Association of Geographers - Ontario Division (**Newman**, Malcolm, and Thompson).
- 2005. American Society of Mammalogists (**Holloway** and Malcolm)
- 2005. Ecological Society of America (Malcolm, **Puric-Mladenovic**, and **Shi**)
- 2005. Ecological Society of America (**Holloway** and Malcolm)
- 2005. Ecological Society of America (**Vanderwel**, Malcolm, and Smith)
- 2005. Ecological Society of America (**Zigouris**, Malcolm, and Heaven)
- 2005. North American Forest Ecology Workshop (**Vanderwel**, Malcolm, and Smith)
- 2005. Canadian Society of Zoologists (Bowman, **Holloway**, Malcolm, Middel, and Wilson)
- 2004. Workshop on Climate Change and Ontario's Parks; Parks Research Forum of Ontario (Bowman, Wilson, Carr, McEachen, Malcolm, and **Holloway**)
- 2004. Society for Conservation Biology (Malcolm, **Liu**, Hansen, and Hannah)
- 2004. Society for Conservation Biology (**Lambert**, Malcolm, and Zimmerman)
- 2004. Society for Conservation Biology (**Gelok**, Malcolm, Ray, and Naylor)
- 2004. American Society of Mammalogists (**Lambert**, Malcolm, and Zimmerman)
- 2004. American Society of Mammalogists (**Gelok**, Malcolm, Ray, and Naylor)
- 2004. American Society of Mammalogists (**Peters**, Malcolm, and Zimmerman)
- 2003. Entomological Society of Ontario (**Vanderwel**, Malcolm, Sandy Smith)
- 2003. 10<sup>th</sup> Annual Meeting of The Wildlife Society (Malcolm, **Campbell**, **Kuttner**, **Sugar**, and Carleton).
- 2003. 10<sup>th</sup> Annual Meeting of The Wildlife Society (**Holloway**, Malcolm, and Naylor).
- 2003. 10<sup>th</sup> Annual Meeting of The Wildlife Society (Ray, Kays, Gompert, and Malcolm).
- 2002. Third International Canopy Conference, Cairns, Australia (**Vance**, Malcolm, and Smith).
- 2001. Entomological Societies of Ontario and Canada (**Vance**, Malcolm, and Smith).
- 2001. Old-Growth Forests in Canada: A Science Perspective (**Kuttner** and Malcolm).
- 2001. Old-Growth Forests in Canada: A Science Perspective (**Deans**, Malcolm, and Smith).
- 2001. Society for Conservation Biology (**Campbell** and Malcolm).
- 2001. Society for Conservation Biology (Nagel, Naylor, and Malcolm).
- 2001. Society for Conservation Biology (Pardini and Malcolm).
- 2000. Ontario Ecology and Ethology Colloquium (**Campbell**, Kuttner, and Malcolm).
- 2000. Ontario Ecology and Ethology Colloquium (Kuttner, **Campbell**, and Malcolm).
- 2000. Toronto Entomological Society (**Sugar** and Malcolm).

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- 1999. Society for Conservation Biology (**Sugar** and Malcolm).
- 1999. 136th Annual Meeting Entomology Society of Ontario (**Deans**, Smith, and Malcolm).
- 1999. Entomological Society of America Annual Meeting (**Sugar** and Malcolm).
- 1999. 136<sup>th</sup> Annual Meeting of the Entomological Society of Ontario (**Sugar** and Malcolm).
- 1999. Toronto Entomological Association, Toronto, Ontario (**Sugar** and Malcolm).
- 1999. Spring Symposium, Biodiversity and Climate Change: Conservation in the Face of Uncertainty, American Museum of Natural History (Markham and Malcolm).
- 1999. Ontario Ecology and Ethology Colloquium (**Campbell** and Malcolm).
- 1998. Toronto Entomological Society (**Sugar** and Malcolm).
- 1997. Geomatics in the era of RADARSAT (Malcolm, Zimmerman, Cavalcanti, Ahern, and Pietsch).
- 1997. International Theriological Congress (Laurance, Lynam, and Malcolm).
- 1996. 76th Annual Meeting of the Am. Soc. of Mammalogists (Malcolm, Patton, and da Silva).
- 1993. Society for Conservation Biology (Stith, Struhsaker, Malcolm).
- 1991. Ecological Society of America (Bierregaard, Malcolm, and Brown).
- 1990. Society for Conservation Biology.
- 1989. 16th Brazilian Zoology Conference.
- 1987. 14th Brazilian Zoology Conference.
- 1985. 65th Annual Meeting of the American Society of Mammalogists.
- 1984. 11th Brazilian Zoology Conference.
- 1983. 63rd Annual Meeting of the American Society of Mammalogists (Malcolm and Brooks).
- 1983. Canadian Society of Zoologists Annual Meeting (Malcolm and Brooks).
- 1983. 8th Ontario Ethology and Ecology Colloquium (Malcolm and Brooks).
- 1983. 8th Ontario Ethology and Ecology Colloquium (Galbraith, Brooks, and Malcolm).
- 1982. 7th Ontario Ethology and Ecology Colloquium (Malcolm and Brooks).

#### **Invited Workshops (2007 onward only):**

- 2013. Conservation targets for Rouge National Park (Wildlands League), Toronto, ON.
- 2013. Ecological Indicators of Forest Management (Canadian Forest Service), WebEx.
- 2012. Biomass/Biodiversity Workshop (Great Lakes Forestry Centre), Sault Ste. Marie, ON.
- 2010. Multi-cohort stand structural classification using LiDAR (Faculty of Forestry), Toronto, ON.
- 2009. Biofuel Harvesting in Ontario: Policy Directions (Richard Ivey Foundation), Toronto, ON.
- 2008. Boreal Shield Ecosystem Status and Trends Report (Canadian Forest Service), Toronto, ON.
- 2007. Biodiversity Implications of Biofuel Development (Richard Ivey Foundation), Toronto, ON.
- 2007. Adapting to Climate Change (National Center for Ecological Analysis and Synthesis), Santa Barbara, CA.
- 2007. Forest Management Landscape and Site Guides (Wildlands League), Toronto, ON.
- 2007. Geoide Proposal Development, York University, Toronto, ON.

#### **PRESS ACTIVITIES (2007 onward only)**

- 2016. Interview for CBC Toronto News, February
- 2014. Interviewed for La Presse
- 2009. Interviewed for article in the Christian Science Monitor
- 2009. Interview filmed for CBC's "Darwin's Brave New World" (The Nature of Things)  
see: <http://www.cbc.ca/player/Shows/Shows/The+Nature+of+Things/+Brave+New+World/ID/1296281948/2008>.
- 2008. Vanderwel et al. (2007) featured in "Current Results: Key Discoveries about Our Environment" (web-based news service)
- 2007. Interviewed and quoted in four Toronto Star Articles

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- 2007. Profiled in Ontario Nature magazine (January)
- 2007. CBC National News (Radio), March
- 2007. The Current, CBC Radio, April
- 2007. Interview for CBC National News, May

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**TEACHING**

Graduate Coordinator, Faculty of Forestry

2012-present

**Undergraduate Courses Taught:**

|             |   |                             |
|-------------|---|-----------------------------|
| FOR400      | Advanced Seminar in Forest Conservation         | 2004-2011                   |
| FOR413/1555 | Wildlife Ecology and Management                 | 2001, 2002, 2004-2011, 2013 |
| FOR200      | Conservation of Temperate Forests               | 2000-2002                   |
| JFG328      | Conservation and Management of Canada's Forests | 1997-1999                   |

**Graduate Courses Taught:**Course coordinator:

|              |  |                                  |
|--------------|--|----------------------------------|
| FOR3006      | Case Study Analysis in Forest Conservation   | 2005-2006                        |
| FOR3009      | Forest Conservation Biology  | 1997, 1998, 2001-2003, 2005-2016 |
| FOR3001      | Biodiversity of Forest Organisms   | 2011-2015                        |
| FOR 413/1555 | Wildlife Ecology and Conservation  | 1998-2002, 2004-2011, 2013       |
| FOR1900      | Advanced Topics in Forestry: A Short Course in Statistical<br>(Especially Multivariate) Methods for Ecologists | 2000, 2007                       |
| FOR3011      | International Forest Conservation Field Camp<br>(Brazil)   | 1999, 2010                       |
| FOR3011      | International Forest Conservation Field Camp<br>(Costa Rica)   | 2015                             |
| FOR3012      | Analytical Methods in Forestry (Statistics Module)   | 2007-2015                        |
| FOR1000      | Graduate Research Methods (Statistics Module)  | 2015                             |

**Team teaching:**

|         |   |                      |
|---------|---|----------------------|
| FOR201  | Conservation of Tropical and Subtropical Forests                | 2016                 |
| FOR3011 | International Forest Conservation Field Camp<br>(Bahia, Brazil) | 2009                 |
| FOR3008 | Research Paper in Forest Conservation                           | 1997-2002, 2004-2015 |
| BIO395  | Conservation Biology  | 2008                 |
| ECE496  | Electrical Engineering Design Project                           | 2008, 2011, 2012     |
| FOR3009 | Conservation of Global Forest Ecosystems                        | 1999                 |
| FOR3001 | Biodiversity of Forest Organisms                                | 1996-2002, 2004-2010 |
| FOR3002 | Applied Ecology   | 1997-2002            |
| FOR3006 | Case Study Analysis in Forest Management                        | 1996, 2007           |
| FOR1580 | Forests in the Developing World                                 | 1997                 |
| FOR1581 | Tropical Forest Management and Conservation                     | 1996, 1999           |

**Guest Lecturer:**

|          |  |                       |
|----------|--|-----------------------|
| EESC04H3 | Biodiversity and Biogeography                        | 2012-15               |
| FOR1331H | Advanced Forest Entomology                           | 2004-2006, 2008, 2012 |
| GGR403H1 | Global Ecology and Biogeochemical Cycles (Geography) | 2006                  |
| GGRC41H3 | Current Topics in Human Geography                    | 2006                  |
| BIO395   | Conservation Biology                                 | 2000, 2001            |
| FOR1000  | Graduate Seminar I                                   | 1997-2002, 2004-2006  |
| FOR3000  | Current Issues and Approaches in Forest Conservation | 1996, 1997            |
| FOR3002  | Applied Ecology                                      | 1996, 2010-12         |

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|         |  |                              |
|---------|--|------------------------------|
| FOR1067 | Fundamentals of Forestry                             | 1997                         |
| JBF1436 | Landscape Ecology and Methods                        | 1996                         |
| SCI199Y | First Year Seminar                                   | 1998                         |
| FOR1581 | Tropical Forest Management and Conservation          | 2001, 2002, 2004, 2005, 2006 |
| ENV200  | Assessing Global Change: Science and the Environment | 2003                         |

#### **Postdoctoral Supervision:**

|            |   |
|------------|---|
| 2010/2011. | Ben Kuttner (MITACS Elevate Industrial Fellowship: Ontario Forest Resource Inventory Enhancement using ADS40 Aerial Imagery and LiDAR data) |
| 2009.      | Francisca Matos (Landsat-based characterization of selective logging in the Amazon)   |
| 2003/2004. | Danijela Puric-Mladenovic (Adaptive responses to climate change-induced tree migration in Ontario)  |
| 2003/2004. | Hua Shi (Adaptive responses to climate change-induced tree migration in Ontario)  |
| 2001/2002. | Canran Liu (Migration rates and biodiversity loss under global warming)   |

#### **Graduate Student Supervision:**

##### Completed:

- Sztaba, A. 2014. Abundances of cavity-nesting birds and their dead wood resources in closed-canopy managed and unmanaged mixedwood forests of boreal northeastern Ontario. **M.Sc.F.** (co-supervised with P. Drapeau).
- Piasek, P. 2012. Responses of ground beetle (Carabidae) communities to experimental downed wood removal. **M.Sc.F.** (co-supervised with S. Smith).
- Iraci, J. 2011. Nutrient dynamics of downed woody debris in boreal mixedwood stands. **M.Sc.F.** (co-supervised with D. Morris).
- Richmond, S. 2011. Effects of single-tree selection harvesting on Rose-breasted Grosbeaks (*Pheucticus leudovicianus*) in a predominantly forested landscape. **Ph.D.**
- Hayashi, K. 2011. Climate-induced tree migration in southern Ontario: pathways and source populations. **M.Sc.F.**
- Kuttner, B. 2010. Multi-cohort stand structural classification for boreal forest types: ground- and LiDAR-based approaches. **Ph.D.**, (co-supervised with S. Smith).
- Barkley, E. 2009. Insect communities and multicohort stand structure in the boreal mixedwoods of northeastern Ontario. **M.Sc.F.**, (co-supervised with S. Smith).
- Burrell, M. 2009. Multicohort management and LiDAR: new forest management tools for northeastern Ontario mixedwood bird communities. **M.Sc.F.**, (co-supervised with P. Drapeau).
- Dennis, J. 2009. Saproxylic insect communities in boreal mixedwoods of northeastern Ontario as a function of variation in woody debris quality and quantity and sampling methods. **M.Sc.F.**, (co-supervised with S. Smith).
- Solórzano-Filho, J. 2009. On small mammal sympatry in the southeastern Amazon and ecological relationships with brazil nut dispersal and harvesting. **Ph.D.**, (co-supervised with B. Zimmerman).
- Vanderwel, M. 2009. Modelling effects of partial harvesting on wildlife habitat. **Ph.D.**, (co-supervised with J. Caspersen).
- Kramm, D. 2008. Consensus modeling of tree distributions in Ontario and projected changes under global warming. **M.Sc.** (Primary Supervisor, University of Applied Sciences, Eberswalde, Germany)
- Sharkey, C. 2008. Small mammal communities and multi-cohort stand structure in boreal north-eastern Ontario. **M.Sc.F.**
- Patterson, J. 2007. The ecology of *Glaucomys sabrinus* and *Tamiasciurus hudsonicus* in a fragmented Great Lakes-St. Lawrence forest landscape. **M.Sc.F.**

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- Norghauer, J. 2007. Big-leaf mahogany and its natural enemies: a test of the Janzen-Connell hypothesis in Amazonia, **Ph.D.**, (co-supervised with B. Zimmerman).
- Leite, R. N. 2006. Communities of small mammals in a mosaic of Eucalyptus plantations and primary and secondary forests in the eastern Amazon. **M.Sc.** (National Institute of Amazonian Research, co-supervised with M. N. F. da Silva).
- Holloway, G. 2006. Effects of selection and shelterwood logging on flying squirrel populations in Algonquin Provincial Park. **Ph.D.**
- Gelok, P. 2005. Seasonal habitat associations of American martens (*Martes americana*) in central Ontario. **M.Sc.F.** (co-supervised with J. Ray).
- Vanderwel, M. 2005. Modelling the dynamics of white and red pine coarse woody debris in central Ontario. **M.Sc.F.** (co-supervised with S. Smith).
- Lambert, T. 2004. Small mammals of the south-eastern Amazon and the ecological consequences of selective logging. **Ph.D.** (co-supervised with B. Zimmerman).
- Peters, S. 2004. Effects of selective logging on bat communities and trophic structure in southeastern Amazonia, Brazil. **M.Sc.F.** (co-supervised with B. Zimmerman).
- Pinto, D. 2003. Natural regeneration of big-leaved Mahogany (*Swietenia macrophylla*) in unlogged and selectively logged forests in Southern Pará, Brazil and Kayapó forest tree knowledge and taxonomy. **M.Sc.F.** (co-supervised with B. Zimmerman).
- Vance, C. 2002. The canopy insect communities of old-growth pine and maple stands in the Great Lakes-St. Lawrence forest of central Ontario. **M.Sc.F.** (co-supervised with S. Smith).
- Deans, A. 2002. Influence of variable retention harvesting on insect communities in lowland conifer forests of northeastern Ontario. **M.Sc.F.** (co-supervised with S. Smith).
- Kuttner, B. 2002. Impacts of clearcut logging on small mammal communities in boreal mixedwoods of northeastern Ontario. **M.Sc.F.**
- Christensen, H. 2001. Clearing a common ground: WTO international trade regulations and sustainable forest management. **M.A.** (Geography)
- Campbell, B. 2001. Impacts of logging on bird diversity in boreal mixedwood forests of northeastern Ontario. **M.Sc.F.**
- Sugar, A. 2000. The long-term impacts of clear-cut logging on insect communities in the boreal mixedwood forests of northeastern Ontario. **M.Sc.F.**
- Ramprasad, P. 2000. Influence of variable retention harvesting on plant diversity in lowland conifer forests of northeastern Ontario. **M.Sc.F.** (co-supervised with T. Carleton).

Theses in Progress:

- Kostyukova, K., **Ph.D.**, Understanding spatial variation in Great Lakes - St. Lawrence small mammal populations and relationships with forest structure and dynamics (co-supervised with S. Thomas).
- Karve, A., **Ph.D.**, Effects of experimental downed wood removal on the abundances and ecology of boreal small mammals.
- Croydon-Sugarman, M., **M.Sc.F.**, Effects of experimental downed wood removal on boreal fungal populations (co-supervised with J-M. Moncalvo).
- Van Schie, **Ph.D.**, Ecosystem services in Wolf Lake First Nation traditional lands.

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